THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

POLICE VILLAGE OF ST. EUGENE

TOWNSHIP OF EAST HAWKESBURY

1972

THE

ONTARIO WATER RESOURCES

COMMISSION

REPORT ON A

WATER POLLUTION SURVEY

OF THE

POLICE VILLAGE OF ST. EUGENE

IN

TOWNSHIP OF EAST HAWKESBURY

UNITED COUNTIES OF PRESCOTT AND RUSSELL

DIVISION OF SANITARY ENGINEERING

DISTRICT ENGINEERS BRANCH

1972

Tributary of Rigaud River at downstream side of St. Eugene

Sewer discharge to stream at south side of Main Street East Sample Point No. E-1

WATER POLLUTION SURVEY

OF THE

POLICE VILLAGE OF ST. EUGENE

INDEX

APPENDICES

WATER POLLUTION SURVEY

OF THE

POLICE VILLAGE OF ST. EUGENE

INTRODUCTION

On June 22, 1971 a water pollution survey was performed at the Police Village of St. Eugene, in the Township of East Hawkesbury. Persons interviewed prior to and during this survey included:

Mr. B. Dupuis, Clerk-Treasurer, Township of East Hawkesbury;

Mr. R. Leblanc, Public Health Inspector, St. Lawrence and Ottawa Valleys Health Unit.

GENERAL

St. Eugene is located approximately 10 miles east of Vankleek Hill on County Road 13. The population of this community is approximately 515 (1971 Municipal Directory) and has changed little in the last 10 years. There is no significant industry in this rural hamlet aside from a few commercial establishments including a few stores and two feed mills. St. Eugene is otherwise residential in nature, and it is anticipated that a significant number of retired persons and pensioners make up the population.

Drainage from the area is generally north and/or east to a tributary of the Rigaud River. A sketch of this watercourse in relation to the community is appended to this report.

PREVIOUS REPORT RECOMMENDATIONS AND ACTION TAKEN

A previous OWRC pollution survey report dated May 10, 1962 contained the following recommendation:

"Effective measures should be taken by this municipality to prevent the discharge of untreated or inadequately treated wastes to the local tributary of the Rigaud River."

It became evident from observations made during the 1971 survey that very little action had been taken on this recommendation. Domestic and sanitary wastes continued to be discharged to the above mentioned watercourse.

SEWAGE DISPOSAL

Sewage wastes are generally directed to subsurface septic tank disposal systems. Since the formation of the St. Lawrence and Ottawa Valleys Health Unit in 1968, all new septic tank systems have required an inspection and the approval of the Medical Officer of Health. Prior to this period however, it is understood that it was common practice to direct sewage wastes into the local drainage system.

An inspection of the stream between the east end of the community and the C.P. Railway revealed numerous municipal and/or private sewer outfalls to the watercourse. Untreated and inadequately treated sewage wastes were being discharged to the watercourse from a number of these outfalls. No effort was made to establish ownership of the sewers; however, it was reported that private individuals had frequently extended and connected to existing sewers in order to dispose of their sanitary wastes.

WATER SUPPLY

Water for domestic purposes is obtained from individual well supplies. No particular problems were reported with this means of water supply at the time of the survey. Consequently, no samples were collected from private well supplies.

SAMPLE RESULTS

Samples were collected from the watercourse and from sewer outfalls for bacteriological examinations and chemical analyses. The results of the laboratory analyses and discussions of the meaning of

the results are appended to this report as follows:

Appendix I - Significance of Bacteriological Examinations

Appendix II - Bacteriological Sample Results

Appendix III - Significance of Chemical Analyses

Appendix IV - Chemical Sample Results

The bacteriological sample results clearly illustrate degradation of water quality from the upstream to the downstream side of the community. Examination of the results of samples collected from the sewer outfalls reveal that these discharges are contaminating the watercourse.

The discharge of wastes of this nature is an offence within the meaning of the Ontario Water Resources Commission Act under Section 32(1) which reads as follows:

> "Every municipality or person that discharges or deposits or causes or permits the discharge or deposit of any material of any kind into or in any well, lake, river, pond, spring, stream, reservoir or other water or watercourse or on any shore or bank thereof or into or in any place that may impair the quality of the water of any well, lake, river, pond, spring, stream, reservoir or other water or watercourse is guilty of an offence and on summary conviction is liable on first conviction to a fine of not more than $5,000 and on each subsequent conviction to a fine of not more than $10,000 or to imprisonment for a term of not more than one year, or to both such fine and imprisonment. 1961-62, C. 99, s. 5; 1970, c. 124, s. 10(1)."

CORRECTION OF THE POLLUTION PROBLEMS

The elimination of the sewage discharges to the watercourse will significantly reduce the stream pollution problem. The two approaches available for correction of the problem would appear to be either correction on an individual basis or the development of a municipal sewage works. On the basis of present construction costs and financing arrangements, it is considered that the cost of a municipal sewage works would place a serious financial burden on this community. Correction of the sewage disposal problems on an individual basis would therefore appear to be a more practical approach. In this instance, it would be necessary for each property owner to satisfy the health unit that their sewage wastes are not gaining access to the sewer system or watercourse.

SUMMARY AND CONCLUSIONS

A pollution survey of the Police Village of St. Eugene was performed on May 10, 1962. It was recommended to Township Council at that time that action should be taken to eliminate the discharge of contaminated wastes to a local watercourse. A similar OWRC survey on June 22, 1971 revealed that sewage wastes continued to be discharged to the stream and the quality of the watercourse was further degraded.

In view of the population and the apparent economic climate of this community, it is considered that the cheapest and most effective means of resolving the pollution problems would be on an individual basis. The installation or renovation of septic tank systems and the installation of sewage holding tanks requires the approval of the Medical Officer of Health. The municipality should initiate action in co-operation with the local health authorities for correction

of these pollution problems.

RECOMMENDATIONS

A program for the detection and elimination of contaminated sewage discharges to a tributary of the Rigaud River from the Police Village of St. Eugene should be initiated without further delay.

WCS/jmc

Report prepared by.....W.C. Stevens.....

W.C. Stevens,
Technician,
Div. of Sanitary Engineering.

APPENDIX I

SIGNIFICANCE OF BACTERIOLOGICAL EXAMINATIONS

TOTAL COLIFORM organisms include a wide variety of bacteria ranging from the genus (group) Escherichia Coli (E.coli), which originate mainly in the intestines of man and other warm blooded animals, to the genera Citrobacter and Enterobacter aerogenes. The latter genera are basically found in soil but are also present in feces in small numbers. The presence of total coliforms in water may indicate soil runoff or, more important, less recent fecal pollution since organisms of the Enterobacter - Citrobacter groups tend to survive longer in water than do members of the Escherichia Coli group, and even to multiply when suitable environmental conditions exist.

The FECAL COLIFORM organisms are those coliform bacteria which are of intestinal origin and, therefore, are an indicator of recent fecal pollution. Most of the coliform bacteria found by the fecal coliform test are of the genus Escherichia Coli.

FECAL STREPTOCOCCI organisms are normal inhabitants of the large intestine of man and animals and generally do not multiply outside the human body. In waters polluted with fecal material, fecal streptococci are usually found along with fecal coliform bacteria but in smaller numbers. When the number of fecal streptococci bacteria approximates or is greater than the number of fecal coliform organisms, animals are the probable source.

The OWRC Guidelines and Criteria for Water Quality Management in Ontario (1970) indicate that water used for total body contact recreation can be considered impaired when the total coliform, fecal coliform, and/or fecal streptococcus geometric mean density exceeds 1000, 100, and/or 20 per 100 ml, respectively.

APPENDIX II

BACTERIOLOGICAL SAMPLE RESULTS

Sampling Point	Description	Coliform Bacteria	Fecal Coliforms	Streptococcus
R-1	Creek-downstream from village at Main St. bridge	91,000	1,300	30
R-2	Creek - near centre of village	85,000	1,030	350
R-3	Creek - upstream of village at C.P.R. bridge	3,000	130	30
E-1	Sewer discharge south side of Main St.E.	32,000,000	2,900,000	10,000
E-2	Sewer outfall - north side of Main St.E.	- insufficient flow for sampling		
E-3	Sewer discharge to south side of creek	27,000,000	1,500,000	60,000
E-4	Sewer discharge to south side of creek	800,000,000	77,000,000	60,000
E-5	Sewer outfall to north side of creek	- no flow		
E-6	Sewer outfall to south side of creek	- evidence of sewage wastes - insufficient flow for sampling		
E-7	Sewer to south side of creek	920,000,000	7,500,000	100
E-8	Sewer to south side of creek	39,700,000	39,400,000	48,100

APPENDIX III

SIGNIFICANCE OF CHEMICAL ANALYSES

Biochemical Oxygen Demand is reported in parts per million (PPM) and is an indication of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million, is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally the most significant of the solids analyses with regard to surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams and injury to the habitat of fish.

Nitrogen

Ammonia Nitrogen or sometimes called free ammonia is the insoluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rain water.

The following values may be of general significance in appraising free ammonia content: Low 0.015 to 0.03 ppm; moderate 0.03 to 0.10 ppm; high 0.10 or greater.

Total Kjeldahl is a measure of the total nitrogenous matter present except that measured as nitrite and nitrate nitrogens.

The Total Kjeldahl less the Ammonia Nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

Nitrite Nitrogen

Nitrite is usually an intermediate oxidation of ammonia. The significance of nitrites, therefore, varies with their amount, sources, and relation to other constituents of the sample, notably the relative magnitude of ammonia and nitrite present. Since nitrite is rapidly and easily converted to nitrate, its presence in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

Nitrate Nitrogen

Nitrate is the end product of aerobic decomposition of nitrogenous matter, and its presence carries this significance. Nitrate concentration is of particular interest in relation to the other forms of nitrogen that may be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility.

The following ranges in concentration may be used as a guide: low less than 0.1 ppm; moderate 0.1 to 1.0 ppm; high greater than 1.0 ppm.

Phosphorus

This element is commonly found in nature in the form of phosphates (PO_4). Raw or treated sewage, some industrial wastes, and agricultural drainage contain significant concentrations of phosphates. The laboratory provides two phosphorus determinations:

total phosphorus and soluble phosphorus. Total phosphorus includes orthophosphate, polyphosphate and organic phosphorus, while soluble phosphorus represents orthophosphates only.

Phosphorus is an essential nutrient for plant life and like nitrogen passes through cycles of decomposition and photosynthesis. Nitrogen and phosphorus are both essential for the growth of algae and limitation of these compounds controls their rate of growth.

Generally, soluble phosphorus in concentrations of 0.01 ppm or greater at the beginning of the growing season may cause algal nuisance conditions.

Anionic Detergents as ABS

The presence of anionic detergents as ABS is an indication that domestic waste is present.

Phenols

The presence of phenol or phenolic equivalents is generally associated with discharges containing petroleum products, or with wastes from some industries. It is generally conceded that adequate protection of surface waters will be provided if the concentration of phenols in waste discharges does not exceed 20 parts per billion (ppb). Phenolic type waste can cause objectionable conditions in water supplies and might taint the flesh of fish.

Iron

Water for domestic use should contain less than 0.3 parts per million of iron in order to avoid objectionable tastes, staining and sediment formation. Iron concentrations of not greater than 17 parts per million in waste discharges should permit adequate protection of surface waters.

APPENDIX IV

TOWNSHIP OF EAST HAWKESBURY
POLICE VILLAGE OF ST. EUGENE
CHEMICAL SAMPLE RESULTS

SAMPLING POINT	5-DAY BOD	SUSPENDED SOLIDS	ANIONIC DETERGENTS AS ABS	NITROGEN AS N				PHOSPHORUS AS P	PHENOLS IN PPB
				FREE AMMONIA	TOTAL KJELDAHL	NITRITE	NITRATE		
R-1	3.5	5	0.2	0.2	2.0	.04	0.4	1.2	6
R-2	9.5	5	0.4	.1	2.3	.02	<.1	.65	6
R-3	1.6	5	0.1	.1	1.3	.01	<.1	.20	6
E-1	110.	340	13.	19.	40.	.02	<.1	14.	24
E-3	140.	650	8.8	60.	80.	.03	<.1	21.	6
E-4	170.	250	28.	90.	120.	.02	<.1	59.	20
E-7	440.	490	74.	80.	90.	.07	<.1	26.	600
E-8	200.	360	13.	44.	60.	.03	<.1	24.	65

SAMPLING POINT DESCRIPTION

R-1 Creek - downstream from village below Main St. Bridge

R-2 Creek - near center of village at bridge

R-3 Creek - upstream side of village at C.P.R. Bridge

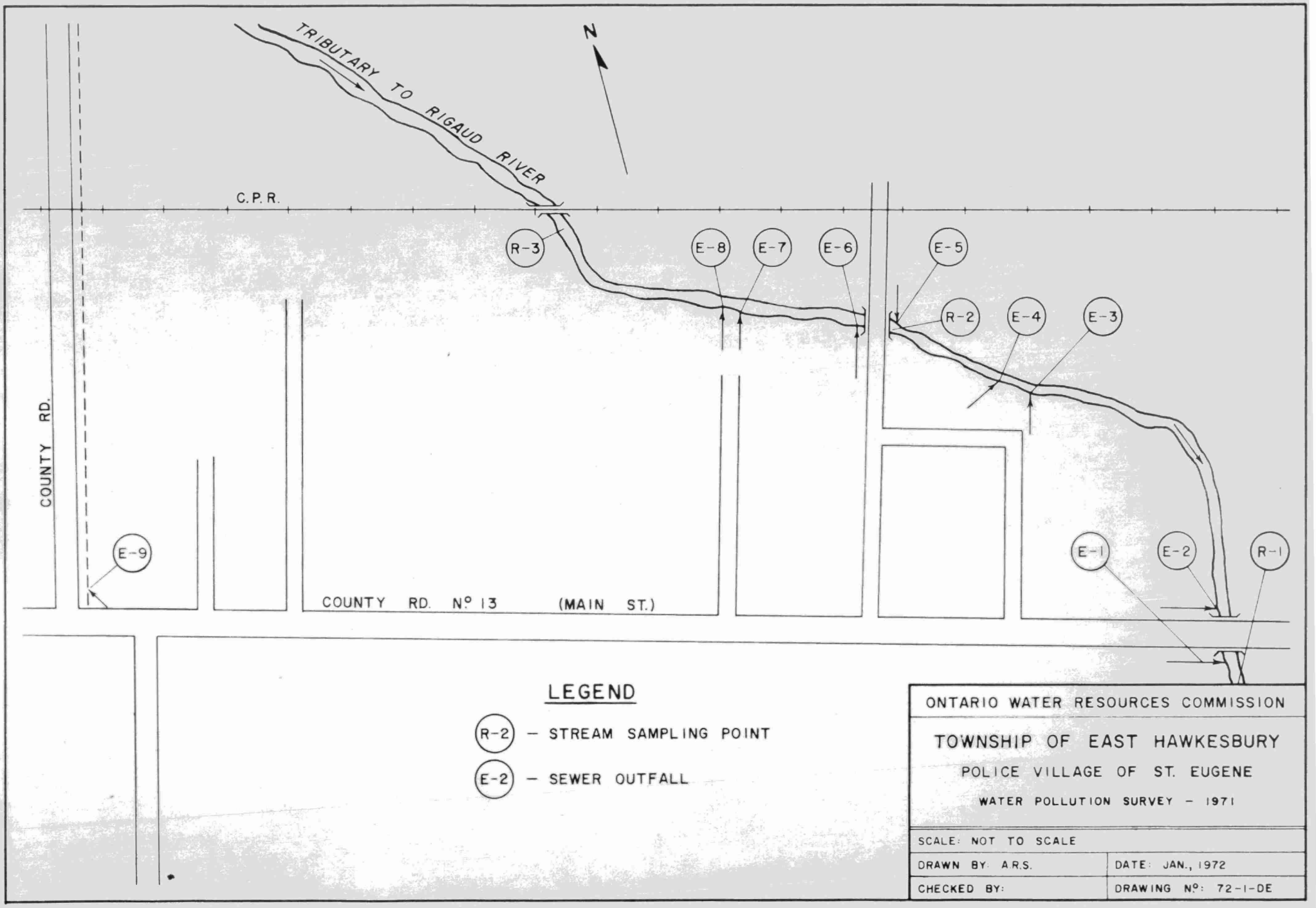
E-1 Storm sewer discharge to creek - south side Main St.E.

E-3 Storm sewer discharge to creek

E-4 Storm sewer discharge to creek

E-7 Storm sewer discharge to creek

E-8 Storm sewer discharge to creek



LEGEND

(R-2) — STREAM SAMPLING POINT

(E-2) — SEWER OUTFALL

ONTARIO WATER RESOURCES COMMISSION

TOWNSHIP OF EAST HAWKESBURY

POLICE VILLAGE OF ST. EUGENE

WATER POLLUTION SURVEY - 1971

SCALE: NOT TO SCALE	
DRAWN BY: A.R.S.	DATE: JAN., 1972
CHECKED BY:	DRAWING Nº: 72-1-DE

ONTARIO
O.W.R.C. Publication

WATER POLLUTION SURVEY OF THE POLICE VILLAGE OF ST. EUGENE, TOWNSHIP OF EAST HAWKESBURY, 1972

TERMINAL STREAM: RIGAUD R.

DATE	ISSUED TO

BROADART CAT. No. 23-115 PRINTED IN U. S. A.

DATE	ISSUED TO

Date Due

PRINTED IN CANADA